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BACKGROUND

- Smoking is a well-established risk factor for prosthetic joint infection (PJI) following total hip (THA) and knee arthroplasty (TKA)
- The extent to which surgeon-specific factors modify infection risk across smoking populations remains unclear

OBJECTIVES

- Evaluate influence of operative time on 90-day PJI rates in patients undergoing total joint arthroplasty by smoking status

METHODS

- Retrospective review of 14,611 primary THAs (2013-2025) and 14,140 primary TKAs (2017-2025)
- Categorization by current, former, or never smokers
- Primary outcome: 90-day PJI
- Baseline PJI rates were compared across smoking statuses
- Mean operative times were compared between infected and non-infected cases
- Logistic regression models were used to determine if prolonged operative time disproportionately increased PJI risk in current or former smokers
- Predicted probability curves were generated from regression models using 90-day PJI as the outcome, operative time and smoking status as predictors
- Analyses were performed for the combined cohort, hips and knees independently

RESULTS

- Overall incidence of PJI in the combined cohort was 0.63%
- Infection rates did not significantly differ by smoking status in hip, knee, or combined comparisons ($P > 0.05$)
- Combined and THA-only groups: infected cases had significantly longer operative time than non-infected cases ($P = 0.015$)
- Unadjusted regression models: prolonged operative time trended towards disproportionate increase in PJI risk for current smokers at extreme operative times; THA trended towards significance for current smokers (OR 1.02, $P = 0.061$)

CONCLUSIONS

- Longer operative time significantly increased risk of 90-day PJI
- Current smokers trend toward slightly higher risk of infection compared to non-smoking patients at longer operative times
- Prolonged operative time does not disproportionately increase the risk of infection in current or former smokers

Table 1: Infection Rate by Smoking Status in THA and TKA

Subset	Smoking Status	Total Patients	Infections	Infection Rate (%)	P-Value
Hips & Knees	Current	1,660	13	0.78	0.331
	Former	10,896	75	0.69	
	Never	16,193	92	0.57	
	Overall	28,749	180	0.63	
Knees	Current	605	4	0.66	0.348*
	Former	4,703	25	0.53	
	Never	8,831	36	0.41	
	Overall	14,139	65	0.46	
Hips	Current	1,055	9	0.85	0.924
	Former	6,193	50	0.81	
	Never	7,362	56	0.76	
	Overall	14,610	115	0.79	

*P-value calculated using Fisher's Exact Test due to low cell counts

Figure 1: Predicted Probability of Periprosthetic Joint Infection by Operative Time and Smoking Status in Combined THA and TKA

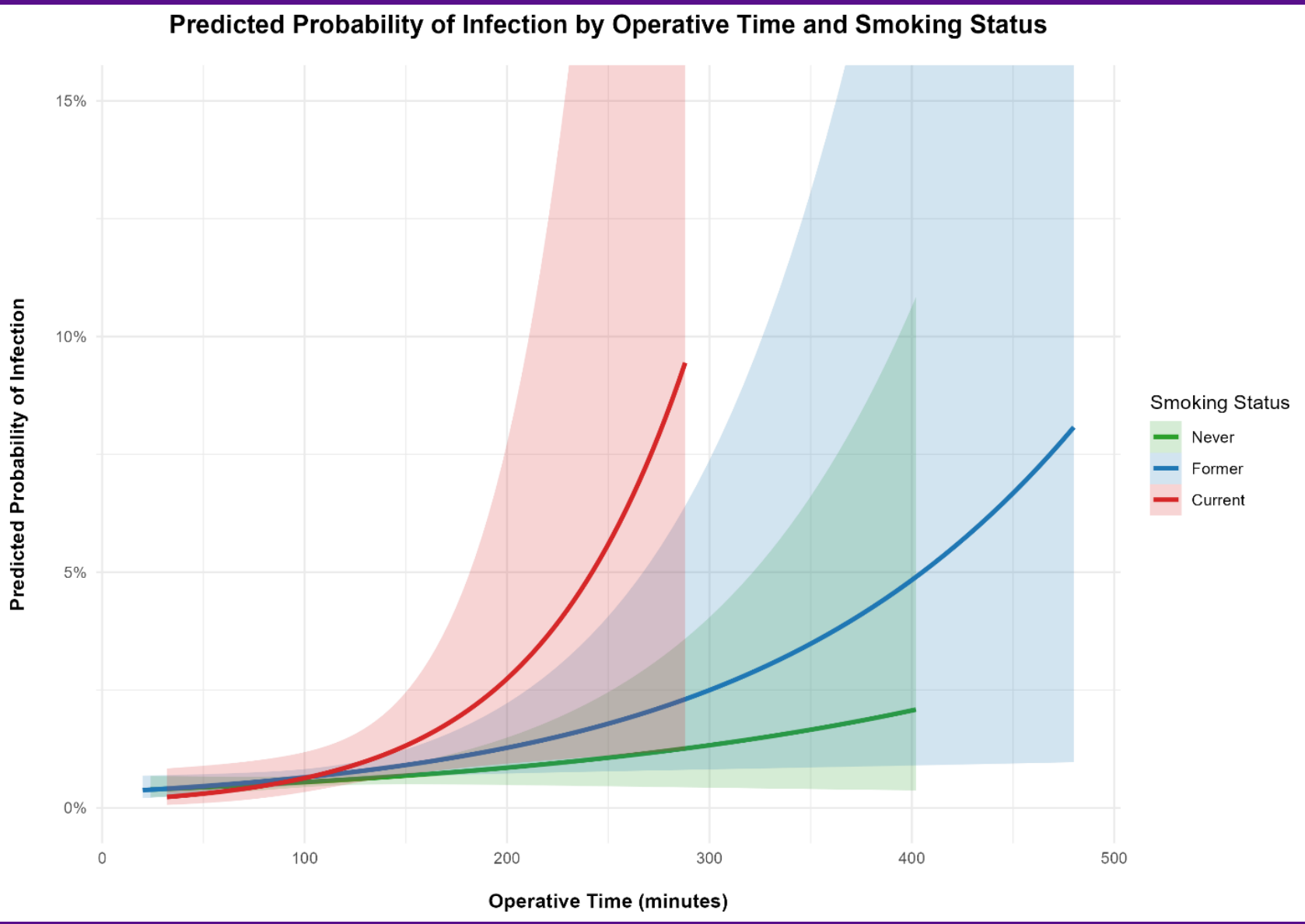


Figure 2: Predicted Probability of Periprosthetic Joint Infection by Operative Time and Smoking Status in TKA

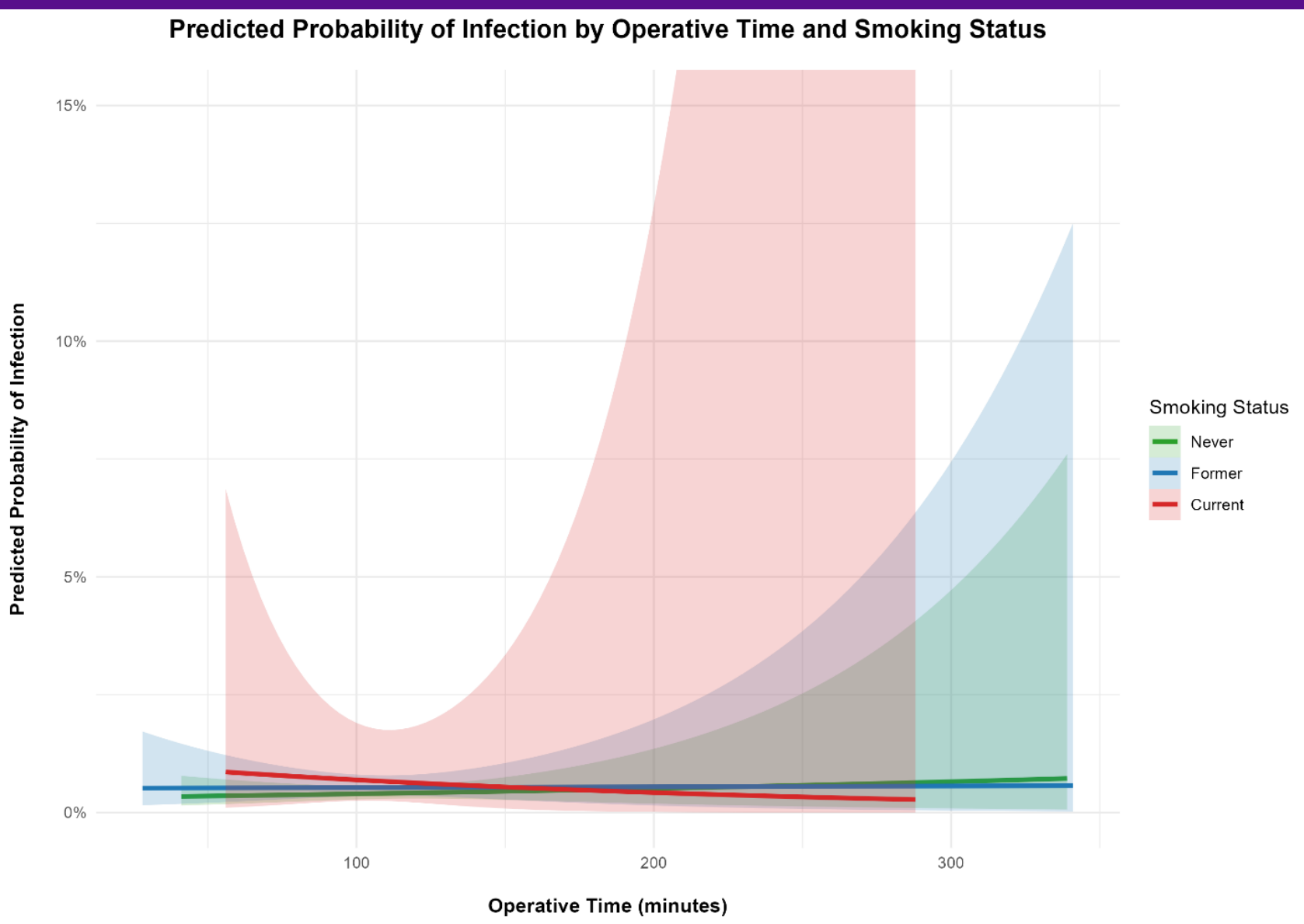


Figure 3: Predicted Probability of Periprosthetic Joint Infection by Operative Time and Smoking Status in THA

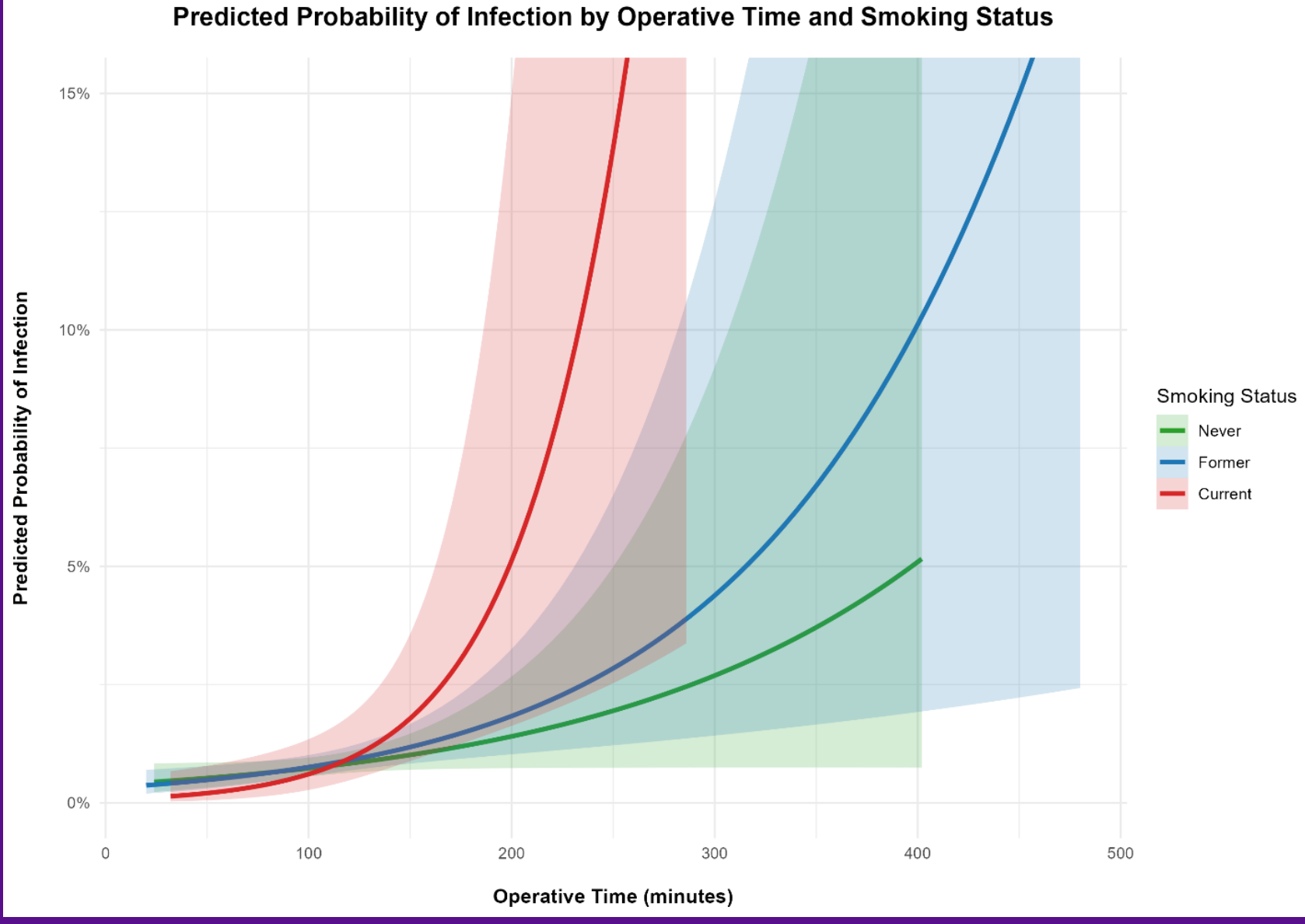


Table 2: Mean Operative Time in Infected vs. Non-Infected Cases in THA and TKA

	Infection		Non-Infection		
Subset	Mean Op Time (min)	N	Mean Op Time (min)	N	P-Value
Hips & Knees	113.4	180	106.3	28,569	0.031
Hips	114.5	115	102.3	14,495	0.015
Knees	111.5	65	110.4	14,074	0.635

Table 3: Logistic Regression Interaction Effects: The Impact of Operative Time and Smoking Status on Infection Risk in Combined THA and TKA

Variable	Odds Ratio	95% CI	P-Value
Operative Time × Former Smoker	1.00	0.99 - 1.01	0.583
Operative Time × Current Smoker	1.01	1.00 - 1.02	0.144
Interaction Effects (Ref: Never Smoker): Added risk per minute of operative time			

Table 4: Logistic Regression Interaction Effects: The Impact of Operative Time and Smoking Status on Infection Risk in TKA

Variable	Odds Ratio	95% CI	P-Value
Operative Time × Former Smoker	1.00	0.98 - 1.02	0.803
Operative Time × Current Smoker	0.99	0.95 - 1.02	0.703
Interaction Effects (Ref: Never Smoker): Added risk per minute of operative time			

Table 5: Logistic Regression Interaction Effects: The Impact of Operative Time and Smoking Status on Infection Risk in THA

Variable	Odds Ratio	95% CI	P-Value
Operative Time × Former Smoker	1.00	0.99 - 1.01	0.611
Operative Time × Current Smoker	1.02	1.00 - 1.03	0.061
Interaction Effects (Ref: Never Smoker): Added risk per minute of operative time			